

Marks, Jeffrey (Jeffrey)

From: Budka, Kenneth C (Kenneth)
Sent: Tuesday, August 23, 2011 4:18 PM
To: Jon Melvin
Cc: Jennifer Manner; Pat.Amodio@fcc.gov; Joseph.Heaps@usdoj.gov; allan.sadowski@ncshp.org; wmler@gcpud.org; Frantz, Fred @ LSG - GSES; tomsorely@cityofhouston.net; bill.schrier@seattle.gov; Tom Jones; Krufky, Kevin M (Kevin); Wright, Morgan (Morgan); Navarette, Lisa (Lisa)
Subject: RE: Follow up on question from APCO Broadband panel
Attachments: Alcatel-Lucent_LTE_Network_Sharing_WP[1].pdf

Dear Jon,

It was nice meeting you at APCO in Philadelphia. Thank you very much for your email.

The LTE standards support a wide variety of network sharing options. The attached whitepaper describes some of the network sharing models used by commercial service providers throughout the world today, and how LTE supports the different models. Some of the deployment models discussed in the whitepaper are potential options for deployment of a national public safety broadband network, for example:

1) Deployment of eNodeBs operating across the Public Safety Broadband Block and D Block which are shared by public safety and potentially multiple operators. Each operator (including public safety) operates its own core network with logically separate, encrypted backhaul links (separate VLANs) between operators' core networks and the shared eNodeBs. The capacity allocated to each operator can be controlled by the network. This can be an attractive model for the establishment of public-private partnerships between public safety and other entities (e.g., utilities). This deployment model is described in the attached whitepaper.

2) Deployment of eNodeBs operating across the Public Safety Broadband Block and D Block which are shared by multiple public safety operators which share a common core network. This deployment model is described in the attached whitepaper.

3) Deployment of eNodeBs which support different LTE band classes. For example, Alcatel-Lucent will soon be supporting multi-band eNodeB configurations for commercial operators for some band combinations. These eNodeBs can be deployed using shared or independent cores.

Other options are described in the whitepaper.

While the LTE standards support a wide variety of network sharing options, business and regulatory issues come in to play that have a significant impact on the availability of products. Alcatel-Lucent will be supporting a number of LTE's network sharing features for commercial operators in future releases of our products. Alcatel-Lucent is committed to supporting the features and configurations public safety needs to build a cost-effective network. We expect that the support of logical network sharing features for public safety (backhaul sharing, air interface capacity sharing, core network sharing), for example, will require development of additional software features beyond what is currently planned for commercial operators. While we believe these features are supportable with additional software development on our existing eNodeB platform, until the regulatory environment is settled, these features may not be made generally available.

When it comes to the support of multiple bands on a common eNodeB platform, a variety of additional technical factors need to be considered: potential range differences between the bands, the need for different amplifiers, filters and antennas (e.g., radio heads) for the bands, co-existence issues, out-of-band emissions requirements... Because of all these factors, additional engineering/design needs to be done for the support of multi-band configurations that is specific to the bands that are supported on an eNodeB. Each design (combination of bands) needs to be addressed on a case-by-case basis. Alcatel-Lucent currently plans to offer a single, logical eNodeB for commercial operators that operates on multiple bands (e.g, 700 MHz and AWS band).

In addition to the technical challenges, there are business issues that need to be considered. For example, commercial LTE coverage may not be available in areas that public safety wants to be covered. Devices must also be available that support the

bands. Commercial service providers may have already deployed equipment that can not be upgraded to support the public safety 700 MHz band. Commercial service providers use equipment from multiple vendors - not all of which might support the needed functionality.

Best,

Ken

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From: Jon Melvin [mailto:jmelvin@co.grant.wa.us]
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Subject: Follow up on question from APCO Broadband panel

Ken

There are a number of us who I have included in this email who have been discussing the potential of the same ENodeB equipment being used by the carriers for their LTE deployments also supporting the Public Safety broadband network in band class 14. By following vendor announcements and the software defined radio technology that is being used in new platforms it appeared to me that this capability was going to be possible. In your position as Senior Director for Advanced Mission Critical Communications for Bell Labs Alcatel Lucent, I appreciate that you were able to confirm for us at APCO that this capability is going to exist in Alcatel Lucent's equipment. Do you have a time frame for when equipment with that capability will be available and if equipment being deployed today will be able to receive that capability with a software update? We are also interested in the ability of the ENodeB to maintain separation of the commercial and public safety traffic. We envision separate SSIDs mapped to separate outputs for backhaul all operating on the same ENodeB. Separation for backhaul could be by VLAN, QnQ, mpls or separate Ethernet outputs. Is this concept or something similar under development at Alcatel Lucent?

The development of infrastructure with the above mentioned capabilities could lead to public private partnerships in which the carriers agree to deploy the ENodeBs including both commercial and Public Safety band class 14 in exchange for physical access to properties and structures owned by state and local government. With this business model it is recognized that public safety would still have to contract for service to cover costs. The partnership for placement of equipment serving both commercial and public safety could also be extended to private structures as the building owners request pico and femto cell deployments for in building coverage. Equipment with the described capabilities would reduce costs of deploying separate ENodeBs and antennas for public safety. It would place this equipment on the same refresh schedule as the carrier's equipment. It would provide State and Local government with an incentive to assist the carriers in gaining access to physical locations and structures that they need for additional deployments. I envision that equipment with these capabilities could be a significant benefit to both the carriers and public safety.

Thanks for your assistance. I will be looking forward to your response.

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